

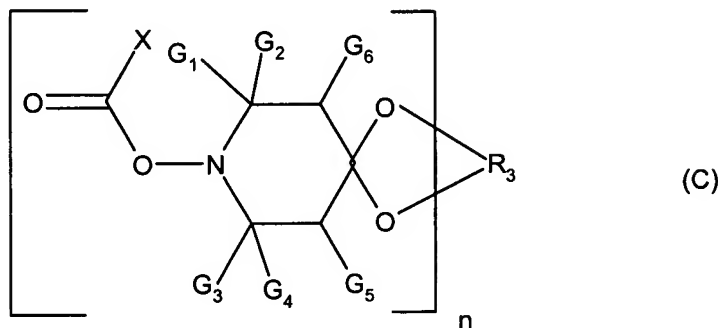
In the Claims

1. (currently amended) A flame retardant composition which comprises

(a) a thermoplastic polymeric substrate and

(b) a mixture of

(i) a hydroxylamine ester of formula C



where

G₁, G₂, G₃ and G₄ are methyl or G₁ and G₃ are methyl and G₂ and G₄ are ethyl;

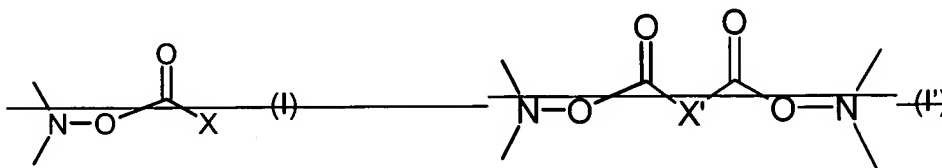
G₅ and G₆ are independently hydrogen or methyl;

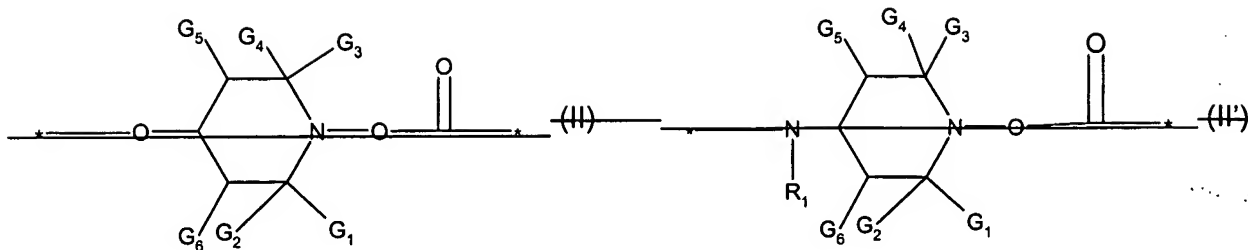
n is 1;

R₃ is C₂-C₈alkylene or hydroxyalkylene or C₄-C₃₆acyloxyalkylene and

X is hydrogen, C₁-C₃₆alkyl or C₆-C₁₀aryl;

~~having a structural element of formula (I) or formula (I') or a polymeric hydroxylamine ester
having a repetitive structural unit of formula (II) or (II')~~





wherein—

X is hydrogen, C₄-C₃₆alkyl, C₂-C₃₆alkenyl, C₂-C₄₈alkinyl, C₆-C₄₀aryl, O-C₄-C₄₈alkyl, O-C₆-C₄₀aryl, NH-C₄-C₄₈alkyl, NH-C₆-C₄₀aryl, N(C₄-C₆alkyl)₂;

X' is a direct bond or C₄-C₃₆alkylene, C₂-C₃₆alkenylene, C₂-C₃₆alkynylene, (C₄-C₆alkylene)-phenylene-(C₄-C₆alkylene) or a group from a dimer acid;

G₁, G₂, G₃ and G₄ are independently alkyl of 1 to 4 carbon atoms, or G₁ and G₂ together and G₃ and G₄ together, or G₁ and G₂ together or G₃ and G₄ together are pentamethylene;

G₅ and G₆ are independently hydrogen or C₁-C₄alkyl; and

R₁ is C₄-C₄₂alkyl, C₅-C₇cycloalkyl, C₇-C₉aralkyl, C₂-C₄₈alkanoyl, C₃-C₅alkenoyl or benzoyl[[:]]

and

(ii) a flame retardant compound selected from the group consisting of halogenated, phosphorus, boron, silicon or antimony compounds, metal hydroxides, metal hydrates, metal oxides and mixtures thereof.

2-6. (canceled)

7. (original) A composition according to claim 1 wherein the hydroxylamine ester is present in an amount of from 0.1 to 15 weight-% based on the weight of the polymer.

8. (previously presented) A composition according to claim 1 wherein the polymer substrate is a resin selected from the group consisting of the polyolefins, the thermoplastic olefins and styrenic polymers or copolymers.

9. (previously presented) A composition according to claim 8 wherein the polymer substrate is polypropylene, polyethylene, thermoplastic olefin (TPO), polystyrene, ABS, high impact polystyrene, expandable polystyrene (EPS) or extrusion foamed polystyrene.

10. (previously presented) A composition according to claim 1 wherein the flame retardant compound is selected from the group consisting of

tetraphenyl resorcinol diphosphite,
chloroalkyl phosphate esters,
polybrominated diphenyl oxide,
decabromodiphenyl oxide,
antimony trioxide (Sb_2O_3),
antimony pentoxide (Sb_2O_5),
tris[3-bromo-2,2-(bromomethyl)propyl] phosphate,
triphenyl phosphate,
bis(2,3-dibromopropyl ether) of bisphenol A,
ammonium polyphosphate (APP),
resorcinol diphosphate oligomer (RDP),
brominated epoxy resin,
tetrabromobisphenol A-bis-(allyl ether),
hexabromocyclododecane,
dibromocyclohexane,
tribromophenol-cyanurate,
ethylene-bis(tetrabromophthalimide),
bis(hexachlorocyclopentadieno)cyclooctane,
calcium sulfate,
chlorinated paraffins,
magnesium carbonate,

melamine phosphates,
melamine pyrophosphates,
molybdenum trioxide,
zinc oxide,
1,2-bis(tribromophenoxy)ethane,
tetrabromo-bisphenol A,
Saytex® BC-56HS,
magnesium hydroxide,
alumina trihydrate,
zinc borate,
ethylenediamine diphosphate (EDAP) and
Oligomeric diisopropyl benzene.

11. (previously presented) A composition according to claim 10 wherein the flame retardant compound is tris[3-bromo-2,2-(bromomethyl)propyl] phosphate, hexabromocyclododecane, tetrabromobisphenol A-bis-(allyl ether), dibromocyclohexane or Saytex BC-56HS .

12. (previously presented) A composition according to claim 1 wherein the flame retardant compound is present in an amount of from 0.1 to 30 weight-% based on the weight of the polymer.

13. (original) A composition according to claim 1 wherein the ratio by weight between component (i) and (ii) is from 10:1 to 1:100.

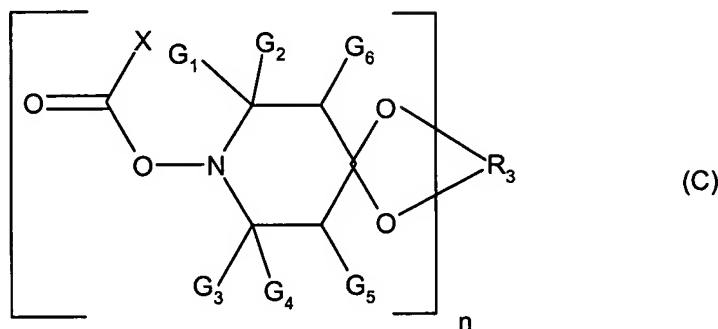
14. (original) A composition according to claim 1, which additionally contains an organic peroxide and/or another radical generator.

15. (original) A composition according to claim 1 which additionally contains a further additive selected from the group consisting of a UV absorber, a sterically hindered amine, a phenolic antioxidant, a phosphite or phosphonite and a benzofuranone or an indolinone.

16. (currently amended) A method of making a thermoplastic polymer flame retarding by incorporating into the thermoplastic polymer

a mixture of

(i) a hydroxylamine ester of formula C



where

G₁, G₂, G₃ and G₄ are methyl or G₁ and G₃ are methyl and G₂ and G₄ are ethyl;

G₅ and G₆ are independently hydrogen or methyl;

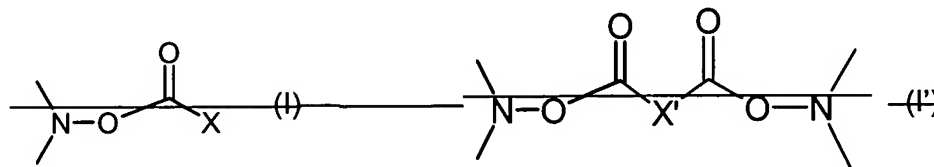
n is 1;

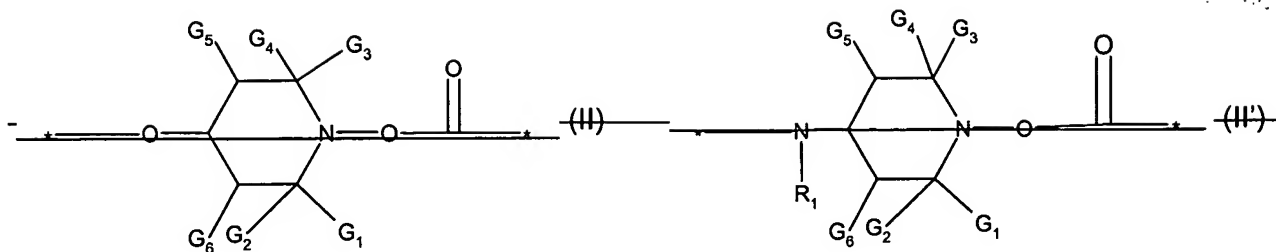
R₃ is C₂-C₈alkylene or hydroxyalkylene or C₄-C₃₆acyloxyalkylene and

X is hydrogen, C₁-C₃₆alkyl or C₆-C₁₀aryl;

~~having a structural element of formula (I) or formula (I') or a polymeric hydroxylamine ester~~

~~having a repetitive structural unit of formula (II) or (II')~~





wherein—

~~X is hydrogen, C₁-C₃₆alkyl, C₂-C₃₆alkenyl, C₂-C₄₈alkinyl, C₆-C₄₀aryl, O-C₄-C₄₈alkyl, O-C₆-C₄₀aryl, NH-C₄-C₄₈alkyl, NH-C₆-C₄₀aryl, N(C₄-C₆alkyl)₂;~~

~~X' is a direct bond or C₁-C₃₆alkylene, C₂-C₃₆alkenylene, C₂-C₃₆alkynylene,~~

~~(C₄-C₆alkylene) phenylene (C₄-C₆alkylene) or a group from a dimer acid;~~

~~G₁, G₂, G₃ and G₄ are independently alkyl of 1 to 4 carbon atoms, or G₁ and G₂ together and G₃ and G₄ together, or G₁ and G₂ together or G₃ and G₄ together are pentamethylene;~~

~~G₅ and G₆ are independently hydrogen or C₁-C₄alkyl; and~~

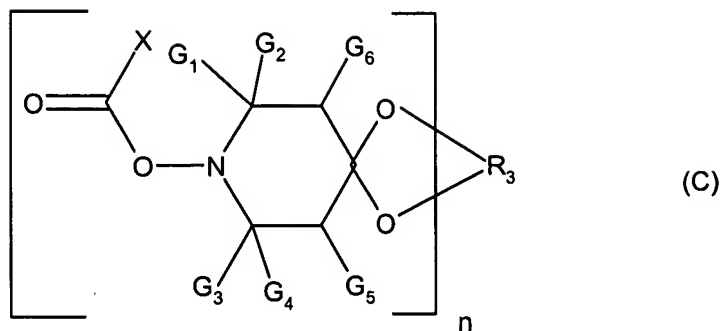
~~R₁ is C₁-C₁₂alkyl, C₅-C₇cycloalkyl, C₂-C₈aralkyl, C₂-C₄₈alkanoyl, C₃-C₅alkenoyl or benzoyl[[:]]~~

and

(ii) a flame retardant compound selected from the group consisting of halogenated, phosphorus, boron, silicon or antimony compounds, metal hydroxides, metal hydrates, metal oxides and mixtures thereof.

17. (currently amended) A flame retardant mixture comprising

(i) a hydroxylamine ester of formula C



where

G₁, G₂, G₃ and G₄ are methyl or G₁ and G₃ are methyl and G₂ and G₄ are ethyl;

G₅ and G₆ are independently hydrogen or methyl;

n is 1;

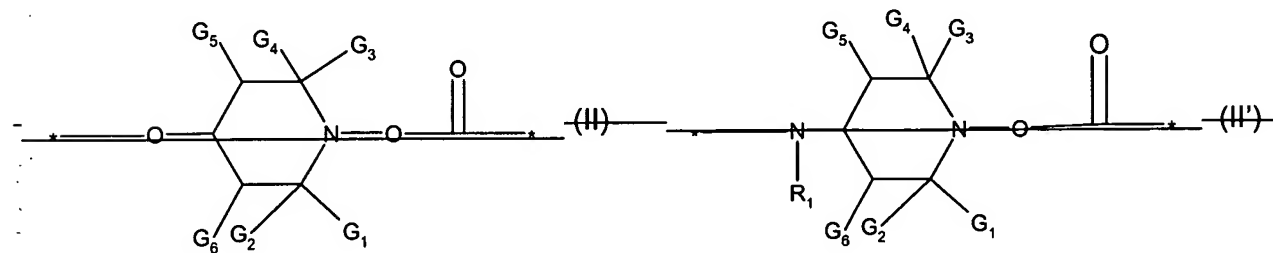
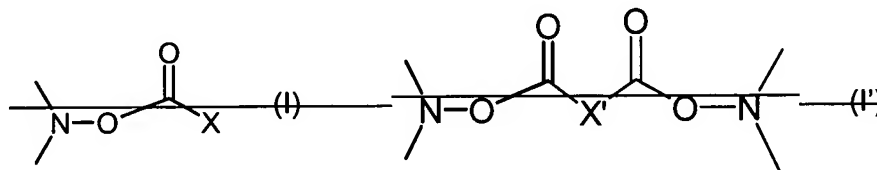
R₃ is C₂-C₈alkylene or hydroxyalkylene or C₄-C₃₆acyloxyalkylene and

X is hydrogen, C₁-C₃₆alkyl or C₆-C₁₀aryl;

~~having a structural element of formula (I) or formula (I') or with a polymeric hydroxylamine ester-~~

~~having a repetitive structural unit of formula (II) or (II')~~

~~—(ii)~~



~~wherein~~

~~X is hydrogen, C₄-C₃₆alkyl, C₂-C₃₆alkenyl, C₂-C₄₈alkinyl, C₆-C₄₀aryl, O-C₄-C₄₈alkyl, O-C₆-C₄₀aryl,~~

~~-NH-C₄-C₄₈alkyl, -NH-C₆-C₄₀aryl, N(C₄-C₆alkyl)₂;~~

~~X' is a direct bond or C₄-C₃₆alkylene, C₂-C₃₆alkenylene, C₂-C₃₆alkynylene,~~

~~(C₄-C₆alkylene)-phenylene-(C₄-C₆alkylene) or a group from a dimer acid;~~

~~G₁, G₂, G₃ and G₄ are independently alkyl of 1 to 4 carbon atoms, or G₁ and G₂ together and G₃ and G₄ together, or G₁ and G₂ together or G₃ and G₄ together are pentamethylene;~~

~~G₅ and G₆ are independently hydrogen or C₄-C₄ alkyl; and~~

~~R₁ is C₄-C₁₂ alkyl, C₅-C₇ cycloalkyl, C₇-C₈ aralkyl, C₂-C₁₈ alkanoyl, C₃-C₅ alkenoyl or benzoyl[[:]]~~

and

(ii) a flame retardant compound selected from the group consisting of halogenated, phosphorus, boron, silicon or antimony compounds, metal hydroxides, metal hydrates, metal oxides and mixtures thereof.

18-19. (canceled)

20. (new) A composition according to claim 1 wherein the hydroxylamine ester of formula (C) is

